A few years ago, I found myself in a challenging relationship with someone who struggled deeply with emotional turmoil. Despite her frequent bouts of distress, I approached each situation with patience, kindness, and a genuine desire to understand her pain. Over time, she confided in me about her past experiences with emotional manipulation and abuse, which had severely impacted her self-worth. This revelation was a pivotal moment for me. I became acutely aware of the profound impact that words and communication can have on an individual's psyche. This realization ignited my interest in **Natural Language Processing (NLP)** as a means to harness technology for emotional healing and support.

Research Experiences

Determined to make a difference, I reached out to **Professor Nancy Fulda** at BYU's **Deep Representations and Architectures for Generative systems and Natural language understanding (DRAGN) Lab**. Under her guidance, I embarked on a project to develop a software application utilizing BYU's large language model, EVE. We focused on pretraining the model with curated content emphasizing self-worth, prevention strategies against physical and verbal abuse, and therapeutic counseling information. The goal was to create a tool that could provide users with resources for healing and empowerment. Our project's impact was recognized when we **won first place at the 2022 BYU ACM YHack Hackathon**.

My passion for leveraging technology to address real-world problems extends beyond NLP. Witnessing my grandmother and other elderly farmers struggle with the physical demands of agriculture due to age and climate challenges, I was inspired to explore robotics and smart farming solutions. I contributed to the development of an autonomous farming robot capable of watering, fertilizing, and weed management through self-learning algorithms and computer vision. This innovation aimed to alleviate the burdens on aging farmers and enhance agricultural productivity in the face of global warming. Our efforts resulted in **winning the 2023 BYU ITCSA Raspberry Pi Competition**, an award traditionally secured by Electrical and Mechanical Engineering students.

At **Sandia National Laboratories**, I tackled cybersecurity challenges by integrating the **DistilBERT** model with **Transformer** architectures to classify security log data into 24 categories of cyberattacks. Rapid detection and classification are crucial for organizations to mitigate threats and prevent financial losses. Our model achieved an impressive 99.7% accuracy and was honored with **first place in the Machine Learning category at the 2024 BYU Capstone Celebration Competition.**

During my tenure at **Pattern Inc.**, a unicorn company specializing in e-commerce solutions, I noticed that support engineers were overwhelmed with repetitive IT tickets. To streamline this process, I pre-trained **GPT-3.5** and **LLaMA2** models but found they lacked precision in generating accurate responses. Through research, I implemented a **Retrieval-Augmented Generation (RAG)** approach combined with **word embedding** techniques. By vectorizing a bespoke dataset of questions and answers, we automated the IT ticket resolution system, reducing resolution times by 87% and workload by 78%. This significant improvement earned me the **"Employee of the Year"** award among 1780 employees at the Accelerate 24 event, one of the best ECommerce Conferences.

Beyond my research experiences, I bring leadership skills, entrepreneurial drive, and a deep commitment to service that I believe will enrich the Stanford community. As co-founder of **Glöd AI**, I led a team to develop the world's first AI-driven product advertisement video generation platform. Leading the Tech Team in BYU's **Korean Business Students Association (KBSA)**, I guided us to **victory at the 2024 BYU ACM Hackathon** with our AI Shorts Generation Platform. My service as an Operations Specialist in the US Army earned me the **General Paik Leadership Award**, **two U.S. Army Commendation Medals**, and the **2019 Best KATUSA Award**, honing my leadership and collaboration skills. Additionally, I vol-

unteered in Melbourne, Australia, supporting individuals battling addictions for two years.

Research Interests

These diverse experiences have equipped me with a unique perspective and a deep understanding of the challenges faced by individuals from various backgrounds. I am eager to leverage these insights to develop innovative solutions at the intersection of **Natural Language Processing**, **Computer Vision**, and **Robotics**, integrating on **Human-Robot Interaction**.

One area of concern is addiction recovery; approximately 50% of Americans aged 12 and older have used illicit drugs at least once, and 14% struggle with pornography addiction. Overcoming these addictions often requires costly psychological and medical interventions that may not be accessible or appealing to everyone. I envision integrating NLP with robotics to create empathetic companions for individuals battling addiction. By leveraging advanced NLP techniques to recognize and respond to emotional states, these robots could offer nonjudgmental support and companionship akin to a supportive family member or pet, thereby reducing barriers to seeking help and democratizing access to care.

Additionally, I aim to develop machine learning models that predict crop growth based on evolving weather patterns and climate data. By integrating these predictive models with robotics and smart farming technologies, we can optimize agricultural processes like planting, irrigation, and harvesting. Creating autonomous farming robots capable of tasks such as watering, fertilizing, and weed management would enhance crop yields and reduce the physical burden on farmers—particularly benefiting older farmers like my grandmother who struggle with the impacts of climate change. Collaborating with experts in various fields, I hope to develop scalable solutions that address both environmental challenges and global food scarcity.

Conclusion

Stanford University's Master of Science in Computer Science program is the ideal environment for me to pursue these ambitions. I am particularly drawn to **Professor Diyi Yang**'s work as the Director of the **Social and Language Technologies Lab**. Her research on developing NLP solutions to address societal challenges resonates deeply with my goal of creating empathetic AI counseling tools. Additionally, I am eager to work with **Professor Jeannette Bohg**, who directs the **Interactive Perception and Robot Learning Lab**. Her exploration of robust sensorimotor coordination in humans and its implementation on robots, particularly in robotic grasping and manipulation, aligns with my interest in developing therapeutic robotic companions that interact seamlessly with users. Furthermore, **Professor Dorsa Sadigh**'s research at the intersection of robotics and machine learning, focusing on interactive robot learning and building robots that learn from and adapt to humans, complements my goal of creating adaptive and human-aligned robotic systems. Collaborating within these esteemed labs and **Stanford Robotics Center** offers the opportunity to meld cutting-edge NLP and robotics research to create impactful solutions that enhance human well-being.

Looking beyond the master's program, I aspire to lead initiatives that bridge government, academia, and industry to combat pervasive issues such as addiction, trauma from abuse, and mental health challenges. By harnessing technology, knowledge, and compassionate leadership, I aim to establish an organization dedicated to providing accessible support systems worldwide. Stanford's resources, network, and culture of innovation will be instrumental in achieving this vision. My unwavering commitment to helping others is the driving force behind my application to Stanford. I believe that with the advanced education and collaborative opportunities the program offers, I can make significant strides in developing technologies that bring healing and support to those in need. No obstacle is insurmountable when one's purpose is rooted in genuine care for others, and I am eager to contribute to the Stanford community while advancing this mission.